CLAIMS

What is claimed is:

1. A system for characterizing a three-dimensional structure, comprising:

a measurement system being configured to receive scattered energy and to produce data signals therefrom, said scattered energy comprising at least a portion of a beam of incident energy rotating relative to the structure and rebounding from the structure; and

a processing system being configured to analyze said data signals to measure a parameter of the structure.

2. The system of claim 1, wherein said scattered energy comprises reflected energy.

3. The system of claim 1, wherein said measurement system includes an energy detector for receiving said scattered energy.

4. The system of claim 3, wherein said energy detector comprises a photomultiplier tube.

5. The system of claim 3, wherein said energy detector comprises a photodiode.

6. The system of claim 1, further comprising a focusing system for focusing said scattered energy, said focusing system being disposed substantially between the structure and said measurement system.

7. The system of claim 1, wherein said measurement system further comprises an energy source for providing said beam of incident energy.

8. The system of claim 7, wherein said energy source comprises a laser.

9. The system of claim 7, wherein said energy source comprises a broad band energy source.

10. The system of claim 1, wherein said beam of incident energy comprises light.

11. The system of claim 1, wherein said beam of incident energy comprises x-rays.

12. The system of claim 1, further comprising a focusing system for focusing said beam of incident energy, said focusing system being disposed substantially between the structure and said measurement system.

13. The system of claim 1, wherein said system is configured to rotate said measurement system.

14. The system of claim 13, further comprising a rotation system for supporting and rotating the structure.

15. The system of claim 13, wherein said processing system is further configured to control said rotation of said measurement system relative to the structure .

16. The system of claim 1, wherein said processing system is configured to compare said data signals with at least one mathematical model of the structure.

17. The system of claim 1, wherein said processing system includes a neural network.

18. A system for characterizing a three-dimensional structure, comprising:

a measurement system being configured to receive scattered energy and to produce data signals therefrom, said scattered energy comprising at least a portion of a beam of incident energy rotating relative to the structure and rebounding from the structure; and

a processing system being configured to analyze said data signals to determine whether the structure has a defect.

19. The system of claim 18, wherein said scattered energy comprises reflected energy.

20. A system, comprising:

a three-dimensional structure;

means for directing incident energy toward said structure;

means for rotating said incident energy relative to the structure;

means for receiving scattered energy, said scattered energy comprising at least a portion of said incident energy rebounding from said structure;

means for producing a spectrum of data signals from said scattered energy; and

means for analyzing said spectrum of data signals to measure a parameter of said structure.

21. The system of claim 20, wherein said three-dimensional structure comprises an interconnect formed on a semiconductor wafer.

22. The system of claim 20, wherein said three-dimensional structure comprises a Copper Damascene structure formed on a semiconductor wafer.

23. A method for characterizing a three-dimensional structure, comprising:

directing a beam of incident energy toward the structure;

rotating said beam relative to the structure;

receiving scattered energy comprising at least a portion of said beam rebounding from the structure;

producing a spectrum of data signals from said scattered energy; and

analyzing said spectrum of data signals to measure a parameter of the structure.

24. The method of claim 23, wherein receiving scattered energy comprises receiving reflected energy.

25. The method of claim 23, wherein analyzing said spectrum of data signals comprises comparing said spectrum of data signals with at least one mathematical model of the structure.